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SHORT REPORT

Carotid Artery Pseudoaneurysm after Carotid Endarterectomy and Bovine Pericardial Patch Angioplasty: Case Report

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Abstract Synthetic patch infection and pseudoaneurysm are rare but recognised complications of carotid endarterectomy (CEA). We describe a case of bovine patch infection with *Serratia marcescens* with acute pseudoaneurysm formation following CEA. Successful interposition vein graft was performed.

Introduction

The incidence of pseudoaneurysm development following CEA is less than 1% and is two to four times more common after patch angioplasty than primary closure.[1] The incidence of patch infection is also low, varying from 0.25% to 0.5%.[2] Symptoms of patch infection include neck swelling, discharging sinus, compression on local structures, neurological deficit, rupture and haemorrhage.

Duplex US is the first line investigation, supplemented by CT angiography to evaluate the extension of infection and status of distal vessels.

Open surgical repair is the treatment of choice, consisting of excision of pseudoaneurysm, debridement of infected tissue and reconstruction of the artery either by primary closure, patch angioplasty or interposition graft. Additional measures include transposition of the sternomastoid muscle and postoperative antibiotic irrigation. Endovascular approach with a covered stent graft has also been described, although this is controversial in the presence of infection.[3]

Bovine pericardium has been increasingly used for the patch material because of the perceived advantages of biocompatibility, low thrombogenicity, and resistance to infection, dilatation and rupture.[4]

This case report describes infection of a bovine pericardial patch with acute pseudoaneurysm formation following CEA.

Case

A 75 year old male with past medical history of hypertension presented with left hemisphere TIA in April 2010.

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Duplex showed a 70% left internal carotid stenosis and with normal right carotid. He underwent left CEA with bovine pericardial patch angioplasty (Vascu-Guard, Synovis 8 × 80 mm). On induction of anaesthesia single shot intravenous Teicoplanin 800 mg was given as antibiotic prophylaxis. Recovery was unremarkable and the patient was discharged home two days later.

He returned to our emergency department six months later with acute swelling of the left neck which had occurred 3—4 days earlier. He did not complain of any pain and was otherwise asymptomatic. Locally the skin was slightly erythematous with a pulsatile mass but no other signs suggesting infection. Investigations were unremarkable (leukocyte 7.2 × 10^9/l) except for a slightly raised CRP of 26.

Duplex US demonstrated a large pseudoaneurysm and a disconnected patch. CT angiogram confirmed a 4 × 4 × 4 cm pseudoaneurysm originating from the carotid bifurcation with infiltration in the surrounding tissues suggesting recent bleed (Figs. 1 and 2).

On opening the pseudoaneurysm a completely disintegrated patch was noted. This was completely removed and the defect was reconstructed with an interposition vein graft (long saphenous vein from the right thigh) after a Javid shunt was inserted. The wound was closed primarily. Microbiological culture identified *Serratia marcescens* and Lactose fermenting coliform. *S. marcescens* is a Gram negative enterobacteria and is an aggressive pathogen associated with hospital acquired infections.

Recovery was uneventful except for temporary left-sided tongue deviation. He was discharged home on Ciprofloxacin 500 mg for 15 days because of sensitivity identified on microbiological culture.

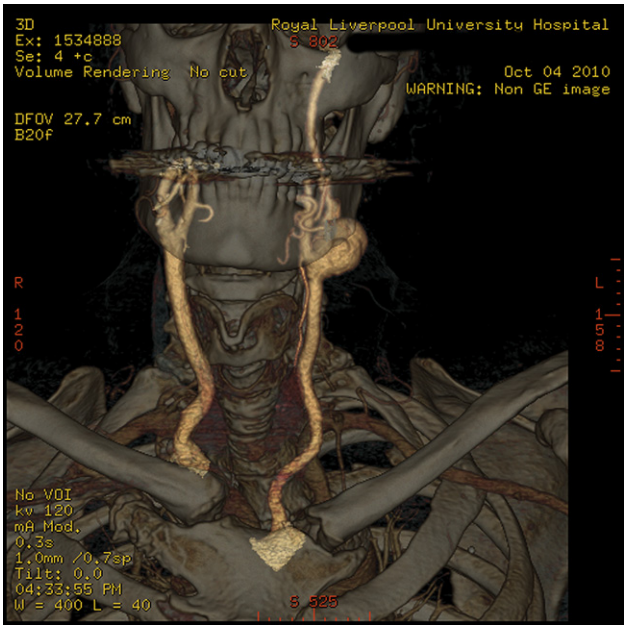

Figure 1 Three dimensional CTA showing a left carotid pseudoaneurysm after carotid endarterectomy and bovine patch angioplasty.

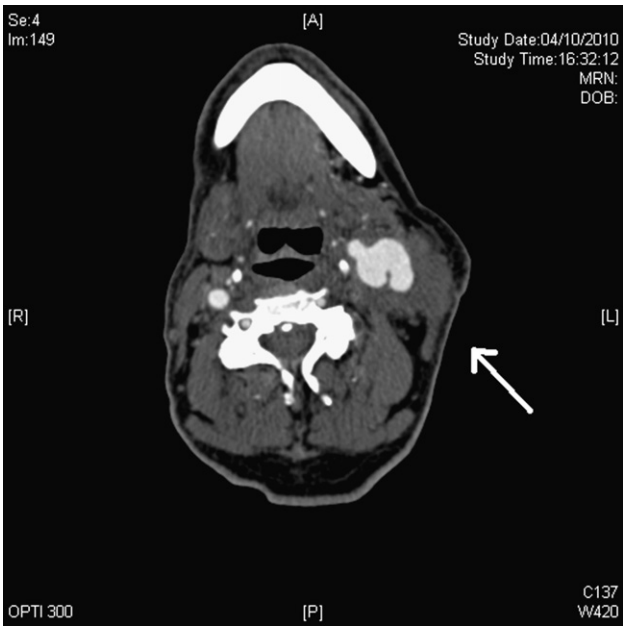

Figure 2 Axial CTA showing the left carotid pseudoaneurysm without any specific sign of infection.

On review at six weeks the patient was asymptomatic from neurological point of view with no wound complications. US Duplex showed the interposition graft to be patent with no stenosis.

Discussion

Synthetic patch closure is now routine following CEA in most centres. Although rare, patch infection does occur, usually pursuing a chronic course presenting as a discharging sinus in the neck.[2] One of the perceived advantages of bovine pericardial patches over other prosthetic materials is better resistance to infection Biasi et al reported a series of 517 patients undergoing CEA, 323 of whom had patch closure with bovine pericardium over a 9 year period, with no reports of infection.[5] More recently, however, Stone et al reported a series of 25 cases of infection following CEA with patch angioplasty (21 PTFE, 2 Polyester, 2 bovine pericardium). In their series 8/25 required debridement and surgical reconstruction while 17 were managed more conservatively. Interestingly both cases of bovine pericardium patch infection were successfully managed fairly conservatively with surgical drainage of infection and antibiotics.[6] In our case, rupture of the infected patch resulted in acute pseudoaneurysm formation, which necessitated more aggressive management with surgical debridement and reconstruction. We presume the effect of infection on the patch is related to the pathogenicity of the infecting organism.

Conclusion

The incidence of prosthetic patch infection following CEA is low and although bovine pericardium is generally thought to be more resistant to infection than more traditional materials, this case adds further evidence that infection

does still occur. Management is determined by the nature of clinical presentation.

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